Cayenne Tick Responsible for Equine Piroplasmosis in Horses

Equine piroplasmosis (EP) is a tickborne disease of horses that has been largely absent from the United States for decades, thanks to cooperative federal and state efforts at eradication. Since 1978, the disease has been kept out of the country by testing horses for infection prior to importation and not allowing infected animals to enter.

While the United States has been considered free from the disease since 1978, sporadic cases have occurred in recent years. The largest of these was discovered on October 2, 2009, in Kleberg County, Texas, when a mare was presented for veterinary care with clinical signs of infection. Clinical signs of EP can include poor appetite and weight loss, and eventually the disease can cause death. EP can also affect all other equines, including donkeys, mules, and zebras.

PEGGY GREB (D2312-1)

Dermacentor variabilis tick on a horse. This tick species was implicated in the transmission of equine piroplasmosis in 2009 in Texas along with *Amblyomma cajennense* ticks (cayenne ticks).

Subsequent investigation and testing by the Texas Animal Health Commission (TAHC) and the U.S. Deparment of Agriculture's Animal and Plant Health Inspection Service (APHIS) confirmed the original case and identified more than 290 additional infected animals on the ranch.

EP is caused by the tick-transmitted microbe *Theileria equi* (also known as *"Babesia equi"*). Several tick species are capable of transmitting *T. equi,* so the first step to controlling the outbreak was to find out which tick species transmitted the disease to the mare.

Only two U.S. tick species—*Dermacentor variabilis* and *Rhipicephalus (Boophilus) microplus*—have previously been shown experimentally to be vectors of *T. equi*. Agricultural Research Service research leader Donald Knowles and his team of scientists at the Animal Diseases Research Unit in Pullman, Washington, worked with APHIS and TAHC to assess and prevent the spread of the Texas outbreak, which could have serious international trade implications if it is found to have spread beyond the original outbreak ranch. Part of their initiative was to identify the tick species responsible for the new outbreak.

"Our group identified the cayenne tick, *Amblyomma cajennense,* as the predominant tick species found on

Mare and her foal, part of the research horse herd. Horses are purpose bred at the Animal Disease Research Unit for use in *T. equi* research.

PEGGY GREB (D2315-1)

Entomologist Kathy Mason and technician Ralph Horn check ticks feeding on a horse infected with *T. equi.*

PEGGY GREB (D2311-1)

(D2316-1) (D2316-2) (D2316-3) (D2316-4) (D2316-5)

Ticks are dissected to test for *T. equi*. Presence of this microbe in the gut proves the tick was exposed to the parasite while feeding on an infected horse. Presence in the salivary glands confirms that it can complete its lifecycle and be transmitted by the tick. Above, left to right: whole tick before dissection; dissected tick with internal organs showing; dissected tick with internal organs but appendages removed; tick gut separated from other tissues and organs and ready for testing; salivary glands separated and ready for testing. Photos by Sara Davis.

horses at the ranch," says Knowles. "Although this species had not previously been shown to be a competent vector, adult cayenne ticks were collected from positive horses and allowed to attach and feed on a noninfected horse, and the ticks successfully transmitted *T. equi*."

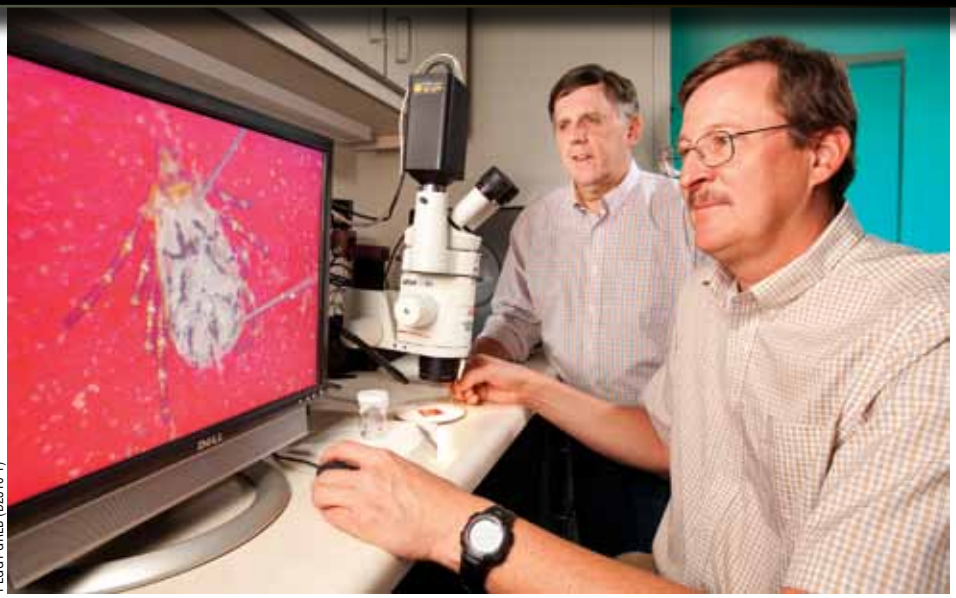
But how did the horses in a geographical area that was free of the disease become infected?

"One of the diagnostic tests previously used widely to screen horses being moved internationally has likely allowed for the entrance of infected horses into countries considered free of infection," says Knowles. That test, says Knowles, is called the "complement fixation test."

"A more recently developed test, cELISA, has enhanced detection of clinically silent, persistently infected horses and could have prevented the spread of the disease."

Knowles and his team are treating some of the South Texas horses with imidocarb dipropionate. Knowles and his team have shown in laboratory tests that this drug not only cures the infected animal, but also renders it incapable of being a carrier that can infect other horses. So far, 14 horses have been successfully treated with the drug, but trials are still ongoing.

"Discovering that this tick species is present in the United States and is capable of spreading piroplasmosis is a crucial development in helping horse ranchers and traders in their quest to keep the United States free of this debilitating disease," says Knowles.—By **Sharon Durham,** ARS.



PEGGY GREB (D2310-1)

Entomologist Glen Scoles (foreground) dissects a tick while research leader Don Knowles observes.

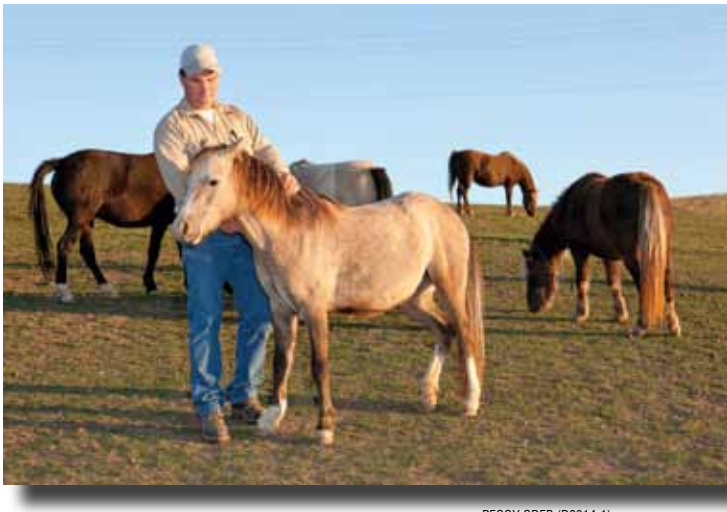
This research is part of Animal Health, an ARS national program (#103) described at www.nps.ars.usda.gov.

Donald Knowles is in the USDA-ARS Animal Diseases Research Unit, 3005 ADBF, Washington State University, Pullman, WA 99164-6630; (509) 335-6022, don.knowles@ars.usda.gov.

Technician James Allison (left) and veterinary medical officer Massaro Ueti collect a blood sample from a horse infected with *T. equi.*

PEGGY GREB (D2313-1)

James Allison prepares a horse for use in research. Horses must be well acclimated to handling before inclusion in research projects.



PEGGY GREB (D2314-1)